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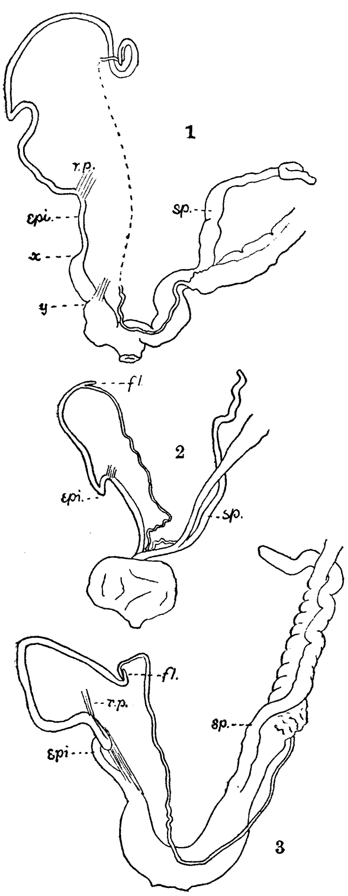
NOTE ON THE ANATOMY OF THE HELICOID GENUS ASHMUNELLA.

BY HENRY A. PILSBRY.

This genus was established[1] by Prof. Cockerell and myself for a series of *Polygyra*-like Helices from New Mexico and Arizona, only one of which, *A. miorhyssa*, was then known anatomically. That we did not exceed the legitimate bounds of inference from mere shell characters, in grouping eight anatomically unknown forms around *A. miorhyssa*, I am now in a position to show.



Living specimens of the following species of the genus have been secured by Prof. Cockerell and transmitted to me for study: *A. thomsoniana porteræ*, Beulah, Upper Sapello Cañon, New Mexico; *A. thomsoniana* (Anc.), one living specimen found by T. D. A. Cockerell and Wilmatte Porter under a rock at Monument Rock, in Santa Fé Cañon, 8,000 feet elevation, in the region of quaking aspens and scrub oaks, December 30, 1899; *A. rhyssa hyporhyssa* (Ckll.), Cloudcroft, Sacramento Mts., N. M., 8,750 feet elevation, collected by Prof. E. O. Wooton.

The examination of these forms fully confirms the anatomical characters ascribed to the genus in the above-mentioned paper.

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[1] These *Proceedings* for 1899, p. 188.

A. thomsoniana (Anc.). Fig. 2.

This species diverges from the others in having three aperture-teeth as in *Triodopsis*. The single specimen secured extruded its penis in drowning, and I found it impossible to retract it. It is notable that only the lower and wider portion is everted, not the tapering upper part, which is probably epiphallic.

The general proportions of the genitalia are as in var. *porteræ*, the spermatheca being long, decidedly over half the length of the penis + epiphallus, in both forms. The lower insertion of the penis retractor muscle in var. *porteræ* seems to be wanting in *thomsoniana*.

The jaw is strongly arcuate with seven moderately strong, separated, distinct ribs.

Radula with 27. 1. 27 teeth, similar to those of *A. hyporhyssa*, the tenth to the thirteenth transitional, outer 10 marginals with the inner cusps bifid.

A. thomsoniana porteræ Pils. and Ckll. Fig. 3.

Genital system similar to that of *A. thomsoniana*, except that it is larger, with a double insertion of the penis retractor muscle.

A. miorhyssa (Dall).

These *Proceedings*, 1899, p. 189, figs. 1 (genitalia), 2 (jaw), 3 (teeth).

The spermatheca is half the length of the penis + epiphallus, being shorter than in *A. thomsoniana* and *porteræ*. The penis retractor muscle has a double insertion, as in the preceding and following forms.

A. rhyssa hyporhyssa (Ckll.). Fig. 1.

The epiphallus is very long, the penis + epiphallus being 2½ times the length of the spermatheca. The lower insertion of the penis retractor muscle is situated decidedly further down than in *A. miorhyssa*, and the spermatheca is shorter.

The jaw is horse-shoe shaped with eight or nine weak unequal ribs.

Radula with 28. 1. 28 teeth, the central and laterals with small ectocones developed, 12 marginals with the inner cusp bifid, outer cusp simple. The fourteenth to sixteenth teeth are transitional.

It will be noticed that all the species have similar kinks in the epiphallus, showing it to be doubled in the body-cavity in much the same manner in all of them. The tridentate forms *thomsoniana* and *porteræ* differ from the others in the greater proportionate length of the spermatheca. The length of the flagellum varies somewhat between the species, but it is so small in all of them that very exact measurements of its length are not readily obtained. Moreover, a vestigial organ so near its extinction as this is not likely to be constant in any species. I would not be surprised to find that it had entirely disappeared in some cases.

Measurements of genitalia, in millimeters.

SPECIES.	Miorhyssa.	Hyporhyssa.	Thomsoniana.	Porteræ.
Total length of penis, epiphallus and flagellum	41	40	ca. 28	34
From atrium to upper insertion of penis retractor	15	11	?	11
Length of flagellum	1½	1	nearly 1	½—¾
Length of spermathecal duct	20½[2]	16	16½	22
Museum No. of shell supplying preparation	73,557	77,869	77,870	76,789

The absolute measurements will, of course, vary with individual variation in the size of the individual; but the comparative lengths of spermatheca and penis + epiphallus, and probably the details of the penis retractor muscle, will evidently afford valuable specific characters.

The study of the anatomy of three more species and subspecies shows *Ashmunella* to be a remarkably distinct genus anatomically. There can be no question of its radical difference from *Polygyra*, but light may be thrown on the nature of its relationship to *Epiphragmophora* by the investigation of the species now referred to that genus which inhabit the same region. Judging from a single half-grown and sexually immature specimen of *E. hachitana* which I was able through the courtesy of Prof. Cockerell to examine, a series strikingly divergent in genitalia from the Californian forms may be found here. I shall be most grateful for living or drowned alcoholic specimens of any *Epiphragmophora* from New Mexico or Arizona. Also for *E. gabbi, facta, rowelli*, or *ruficincta*.

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[2] The length of the spermatheca was given as 27 mm. in our former paper, p. 190. This was a typographical error for 21 mm. In the table here given I have not given the length of the penis, as it is doubtful whether it should be measured to the point marked x in fig. 1 or to that marked y. I incline now to the latter view, as the portion extruded in a specimen of *A. thomsoniana* only extends to y.